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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/805,296

03/22/2004

Hiroyuki Sakai

2635-206

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03/03/2008

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EXAMINER

OLSEN, KAJ K

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

03/03/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/805,296	Applicant(s) SAKAI ET AL.	
	Examiner KAJ K. OLSEN	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-12, 15, 17 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13, 14, 16, 18, 19, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/22/04; 10/3/06; 11/26/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Species B in the reply filed on 11/26/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 1-12, 15, 17, and 20 are withdrawn from further consideration as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13, 14, 18, 19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hada et al (USP 6,547,955) in view of any of Saunders (USP 4,173,745), Reimer (USP 4,641,224), and/or Kawai et al (USP 4,329,665).

4. With respect to claim 13, Hada discloses a gas concentration sensor equipped with a sensor element 100 having a solid electrolytic substrate (col. 4, ll. 40-46) for detecting a gas concentration of a specific component (NO_x) contained in the sensing objective gas (exhaust gas) (col. 2, ll. 19-27), and a heater 103 for heating said sensor element to a predetermined activated temperature (col. 4, ll. 53-63). Hada further discloses a sensor control unit 300 for measuring a weak element current flowing in said sensor element and for intermittently

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supplying electric power to said heater. See col. 7, ll. 33-39 and col. 9, l. 66 - col. 10, l. 17.

Hada further discloses a wiring unit (401, 402) for providing electrical connection between the gas concentration sensor and the sensor control unit (see fig. 11) and includes a control circuit section in a closed space of a casing (fig. 11) but does not explicitly disclose the claimed combination of grounded casing, feedthrough capacitor, and connecting circuit section.

However, the use of set forth combination of elements is old in the art. In particular, Saunders teaches the use of a casing 13 made out of an electrically-conductive material and fixed to a ground potential. Saunders further discloses the use of feedthrough capacitors 11 disposed on a wall portion 25 of the said casing with a connecting circuit section (i.e. the wires connecting 15 and 23) that is disposed outside of the closed space for the remainder of the circuit. See fig. 1 and col. 36-51. In particular, compare fig. 1 of Saunders with fig. 2A of the instant invention.

Reimer also teaches a closed space of a casing where the casing is made of electrically conductive material and fixed to a ground potential where a feedthrough capacitor 60 is disposed in a wall portion 75 of the casing and a connecting circuit section disposed outside of the closed space. The connection circuit section and the other circuit section and electrically connected via the feedthrough capacitor. See fig. 1-3; col. 1, ll. 34-47; col. 4, ll. 14-39; and col. 5, ll. 33-65.

Kawai also discloses the use of a circuit section 9 accommodated in a closed space of a casing 1 that is made of electrically-conductive material. Kawai further discloses a feedthrough capacitor 6 disposed on a wall portion 12 of the casing and a connecting circuit section (3', 5, 7, and 8) connected to wiring unit 4 outside said closed space where the connecting circuit section and control circuit section are electrically connected via the feedthrough capacitor. See fig. 1 and 2, and col. 2, l. 51 - col. 3, l. 22. With respect to the casing being fixed at a ground potential,

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Kawai later discusses that the noise suppressing circuitry must be connected to ground (col. 4, ll. 20-32 and 61-68). Moreover, the previously discussed Saunders and Reimer already discussed that the feedthrough capacitors must be mounted to a ground potential. Each of Saunders, Reimer, and Kawai are drawn to the use of this structure for the purpose of reducing or minimizing electromagnetic interference (see Saunders, col. 1, ll. 5-19 and Reimer, col. 1, ll. 7-25) or suppressing noise (Kawai, col. 1, ll. 5-30). Hada already suggested that the weak currents of its sensor are subject to electromagnetic interference and noise and that care must be taken to ensure the measured currents are not appreciably affected by said interference and noise. See col. 6, ll. 32-55. Because Saunders, Reimer, and Kawai all demonstrate that the use of grounded casings and feedthrough capacitors are a well known means of shielding a signal from electromagnetic interference and electrical noise which Hada admitted is a problem for its signals, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of any of Saunders, Reimer and/or Kawai for the control circuit section of Hada to yield the predictable result of having a measurement signal that is less susceptible to electromagnetic interference or electrical noise.

5. With respect to claim 14 (those limitations not covered above), each of Saunders, Reimer, and Kawai teach dividing a casing into two chambers with a partition plate (i.e. the “wall” discussed above). See Saunders, fig. 1; Reimers, fig. 1-3; and Kawai, fig. 1.

6. With respect to claims 18 and 19, one possessing ordinary skill in the art would recognize that the particular choice of capacitance for the feedthrough capacitor would control how much interference or noise is filtered from the circuitry. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a capacitance of over 1000

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pF, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

7. With respect to claims 21 and 22, Hada discloses a first cell 110 for discharging or pumping oxygen out of or into the sensing objective gas in a chamber and a second cell 120 for decomposing the specific component contained in the gas after said gas passed said first cell and detecting a gas concentration. See fig. 3 and col. 4, l. 64 - col. 5, l. 21.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hada in view of any of Saunders, Reimer, and/or Kawai as applied to claim 14 above, and further in view of Carlson (USP 4,622,527).

9. The references set forth all the limitations of the claim, but did not explicitly disclose that the control circuit section and the connecting circuit section are provided on the same circuit substrate. However, Carlson teaches that both sections of a circuit that are being connected via a feedthrough capacitor can be provided on the same circuit substrate 5. See fig. 1. Because Hada already appears to disclose the presence of a circuit substrate that spans the space of the casing 310 (see fig. 11), then it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Carlson and utilize that same circuit substrate to construct the connecting circuit section as taught by Saunders, Reimer, and/or Kawai for the circuitry of Hada in order to simplify the construction of the combination of control circuit and connection circuit sections.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schwartz et al (USP 4,658,938) discloses the use of a feedthrough capacitor to suppress noise in an alternative sensor having weak measurement signals, much like Hada and the instant invention. JP 57-169644 also teaches the use of a feedthrough capacitor for noise suppression in an alternate automotive sensor. It is noted that JP 57-169644 has the same assignee as Hada (Denso) indicating that the assignee of Hada was already aware of the use of feedthrough capacitors and electrically conductive casings for noise suppression.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAJ K. OLSEN whose telephone number is (571)272-1344. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Kaj K Olsen/
Primary Examiner, Art Unit 1795
March 5, 2008